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26 May 2011

Commission Secretary
Office of the Secretary
Federal Communications Commission
Room TW-A325
445 12th Street, SW
Washington, DC 20554

Subject: WT Docket No. 11-79 – Spectrum Needs for the Implementation of Positive Train Control Provisions of the Rail Safety Improvement Act of 2008

Dear Sir/Madame:

The Wireless Telecommunications Bureau has requested comment from commuter railroads and other parties regarding spectrum issues arising from Positive Train Control technology. As a major commuter rail stakeholder in the north east region, NJ TRANSIT offers the following remarks to facilitate the acquisition of the essential radio-frequency (RF) spectrum that is the foundation of interoperable PTC technology adopted by all freight and commuter railroads in compliance with the Rail Safety Improvement Act (RSIA) of 2008.

INTRODUCTION

NJ TRANSIT proposes that the FCC assist rail operating entities that seek RF spectrum to support their PTC systems. NJ TRANSIT explains is rationale in addressing the FCC inquiry:

- A description of the NJ TRANSIT commuter rail system
- The range of geographic coverage required from its RF spectrum
- Challenges of the RF spectrum acquisition process and its efforts to date
- Impacts of RF spectrum on PTC functionality and associated railroad operations

RECOMMENDATION

Ultimately, NJ TRANSIT recommends that a portion of 220 MHz RF spectrum be dedicated for PTC systems and offered to commuter, intercity and freight railroads that share the same right-of-way. This would simply duplicate the approach previously adopted by the FCC with respect to railroad voice communications (160 MHz) and radio (900 MHz) channels in assigning bandwidth for these purposes.

Since PTC is required by RSIA 2008 and Federal Railroad Administration (FRA) regulations (49 CFR Part 236 Subpart I) and as a result rail passenger services and many Class I freight railroads require 220 MHz RF spectrum to comply with these requirements, allocation of this portion of the RF spectrum is both fair and appropriate for all railroad operators affected by the PTC mandate. Furthermore, since most operating rail systems exist in either a host or tenant relationship, competition with one another for RF spectrum is detrimental and complicates achievement of the FRA's PTC goal.

Specific assistance from the FCC in the form of a channel grant for PTC and/or a spectrum coordinator would greatly facilitate this effort for all railroads. In addition, this would most likely result in an overall greater efficiency of usage than if each railroad independently attempts to acquire the necessary channels.

BACKGROUND

NJ TRANSIT is a commuter rail system that carries over 300,000 passengers per day on its lines. NJ TRANSIT has achieved a high standard of safety that is reflected in a low level of FRA reportable accidents/incidents to date.

Currently, NJ TRANSIT operates 11 commuter rail lines in New Jersey, serves 116 municipalities, via 996 directional route-miles, with a fleet of over 1200 locomotives, cars, and coaches. NJ TRANSIT also serves Penn Station New York, using Amtrak's Northeast Corridor and stores trains in Sunnyside Yard in Queens, NY. Currently NJ TRANSIT also provides service between Amtrak's 30th Street Station in Philadelphia, PA and Atlantic City, NJ via both the Northeast Corridor and NJ TRANSIT's Atlantic City Line. NJ TRANSIT also provides a segment of Metro-North Railroad's "West of Hudson" service.

As required by RSIA 2008 NJ TRANSIT has embarked on a program to implement PTC that complies with 49 CFR Part 236, Subpart I. NJ TRANSIT's plan for PTC includes requirements for interoperability with Amtrak and various freight railroads that operate over NJ TRANSIT tracks, including Conrail, Norfolk Southern, CSX, Morris & Essex Railroad, and Southern Railroad of New Jersey. In order to support this interoperability, NJ TRANSIT is implementing PTC in two ways:

- Furnish a PTC system known as ASES II that is fully compatible with the Amtrak ACSES II PTC system used on the Northeast Corridor
- Furnish a PTC system that is fully compatible with the Interoperable Electronic Train Management System (I-ETMS) formerly referred to as the Vital Electronic Train Management System (V-ETMS); by installing I-ETMS on its commuter rail lines.

Each of these systems utilizes a different communications protocol and will therefore be implemented using separate radios and consequently separate radio channels. Amtrak intends to utilize 220 MHz spectrum for ACSES II and the freight railroads intend to utilize 220 MHz

spectrum for I-ETMS, NJ TRANSIT will be seeking 220 MHz spectrum suitable for its ASES II system.

SPECTRUM AND MARKET AREA COVERAGE

In order to support interoperability as required by FRA regulation, NJ TRANSIT intends to use 220 MHz spectrum for its PTC. Since NJ TRANSIT is not currently a license holder in for 220 MHz, NJ TRANSIT is seeking to acquire licenses. Like most railroads, NJ TRANSIT uses 160 MHz for voice communications; this was dedicated by the FCC for this specific purpose. It is preferable to have the PTC data radios operate with some frequency separation from the voice radios in order to minimize receiver desensitization. Both the voice and data mobile antennas will be mounted on the roof of the locomotive within a fairly limited distance of each other and with no vertical separation. Therefore, transmission of voice at 160 MHz and data at 220 MHz, enables use of a simple filter to minimize receiver desensitization.

The radios selected for use by Amtrak and the freight railroads operate with a 12.5 KHz bandwidth. If the channels selected have a narrower bandwidth (such as 5 KHz) then adjacent channels will be used in order to create an aggregate channel width of 12.5 KHz. The Amtrak radio uses Time Division Multiple Access (TDMA). There are 12 inbound and 12 outbound timeslots, so that twelve trains can be accommodated on a single simplex channel. The radios are capable of operating full duplex and this would be the NJ TRANSIT-preferred mode as it will support up to 24 trains per radio which is sufficient for the worst case train density.

Initial reviews of spectrum availability at 220 MHz indicate that there are multiple parties with licenses at 220 MHz including AMTS band licensees and IVDS band licensees. However, the large geographic footprint of the NJ TRANSIT area of operation which includes the Metropolitan New York area as well as Philadelphia will contribute to the complexity of obtaining the necessary spectrum. This demand for the requisite portion of the spectrum is compounded by spectrum requirements emanating from Amtrak, Metro-North Railroad and the Long Island Rail Road. Clear guidance regarding use of AMTS for PTC would greatly enhance NJ TRANSIT's ability to move forward with a frequency acquisition plan.

In order to achieve effective communications, the radio at control point A cannot operate on the same frequency as the radio at the adjacent control points unless there is a sufficient level of RF isolation. As a result of real world conditions and because there are intersecting rail lines, NJ TRANSIT has identified a four channel frequency re-use pattern will provide the necessary isolation. More than 70 radio sites are anticipated to be required.

NJ TRANSIT has identified areas in the following counties that will require system coverage:

1. Atlantic, NJ
2. Camden, NJ
3. Burlington, NJ
4. Mercer, NJ
5. Middlesex, NJ
6. Monmouth, NJ
7. Ocean, NJ
8. Somerset, NJ
9. Hunterdon, NJ
10. Warren, NJ
11. Union, NJ
12. Morris, NJ
13. Sussex, NJ
14. Passaic, NJ
15. Bergen, NJ
16. Essex, NJ
17. Hudson, NJ
18. Manhattan, NY
19. Richmond, NY
20. Rockland, NY
21. Orange, NY
22. Pike, PA
23. Philadelphia, PA

In terms of Cellular Market areas, NJ TRANSIT will need licenses in the following markets to deploy ASES II:

CMA001 – New York	CMA121 – Trenton
CMA004 – Philadelphia	CMA134 – Atlantic City
CMA058 – Allentown	CMA144 – Orange County
CMA062 – New Brunswich	CMA550 – NJ1 – Hunterdon
CMA070 – Long Brunch	CMA551 – NJ2 – Ocean

In terms of Economic Area Groupings (EAGs), NJ TRANSIT will need licenses in the following Markets to deploy ASES II:

- EAG001 – New York-North New Jersey-Long Island, NY-NJ-CT-PA-MA-VT
- EAG002 – Philadelphia-Wilmington-Atlantic. City, PA-NJ-DE-MD

In terms of Basic Economic Area (BEAs), NJ TRANSIT will need licenses in the following Markets to deploy ASES II:

- BEA010 – New York-North. New Jersey-Long Island
- BEA012 – Philadelphia-Wilmington-Atlantic City

In Automated Maritime Telecommunications System (AMTS) channels, NJ TRANSIT will need licenses in the following Markets to deploy ASES II:

- AMT001 – Northern Atlantic
- AMT002 – Mid-Atlantic

Given the critical nature of PTC data communications, NJ TRANSIT prefers a licensing arrangement that provides strong protection from adjacent co-channel users. So while coverage throughout the entire above-defined areas is not necessary, if there are other users in these areas, NJ TRANSIT would need primacy along the rail line.

RF SPECTRUM ACQUISITION

NJ TRANSIT has established the areas of coverage required for the PTC installation on its passenger service territory; and it has identified those entities that hold licenses to the required RF spectrum. This has enabled NJ TRANSIT to consider the feasibility of joint acquisition of RF spectrum with adjacent, host or tenant passenger rail agencies. NJ TRANSIT and its adjoining commuter rail partners wish to avoid altering the competitive marketplace to each other's detriment. Nevertheless, the proscriptive procurement requirements of public agencies make joint procurements impractical.

The class I freight railroads have acquired 220 MHz RF spectrum long in advance of RSIA 2008, however, they are unable to commit to offering the necessary bandwidth to NJ TRANSIT until such time as their own needs are fulfilled. Since RSIA 2008 established a deadline of December 2015 for PTC implementation, NJ TRANSIT is compelled to acquire 220 MHz as soon as possible.

Therefore, NJ TRANSIT has issued a "Request for Expressions of Interest (EOI) for Radio Frequency Spectrum for Positive Train Control". NJ TRANSIT is evaluating these (confidential) responses and will proceed with a Request for Proposal (RFP) for RF Spectrum acquisition. The EOI responses have not indentified a single source of all the necessary RF spectrum, and this means NJ TRANSIT may have to negotiate with multiple license holders, which is a complication. NJ TRANSIT's EOI process has also revealed encumbrances on some RF spectrum licensees that create ambiguity in their latitude to offer spectrum bandwidth. It would not be prudent or advisable for NJ TRANSIT to collaborate such a licensee. Spectrum acquisition is required only for PTC so it is not unreasonable to suggest cooperation or support from the FCC in pursuit of this public service objective.

RF SPECTRUM – IMPACTS on PTC FUNCTIONALITY and RAILROAD OPERATIONS & INTEROPERABILITY

NJ TRANSIT has performed a preliminary design for radio coverage along its lines. This design is based on locating radio sites adjacent to NJ TRANSIT control points (along each of its 11 rail lines). The vital signal equipment at each control point will then use the data radios to communicate to trains that are in the vicinity of the control point. In general terms, the equipment at each control point needs to be able to communicate to trains that are within safe braking distance of the control point. This distance varies dependent on the speed of the train, type of train, grades and curves.

- Providing coverage from sites adjacent to the rail line allows for coverage design that minimizes the coverage in unused areas. As the 220 MHz data radios are intended for communications to trains, coverage in areas off the rail line, as would be provided from high-level sites, is not necessary. In general, coverage is necessary only along a path approximately 200 feet wide along the rail line. A few larger interlocking would widen this for a limited distance, but still be narrower than a typical antenna pattern from a directional gain antenna.

- The number of trains that need to be served by the radio at each control point is known. As there are a set number of tracks in the vicinity of each control point, the number of trains that may be located within this area can be determined. NJ TRANSIT has been able to determine that no more than 24 NJ TRANSIT/Amtrak trains will be within range of a radio site and this can be handled with a single (full duplex) channel.

The FRA is requiring railroads to work cooperatively in implementation of PTC. The "Host" railroad (in most cases the owner and maintainer of the line) must reach agreement with the "Tenant" railroads (those railroads that operate over the line). This cooperation includes use of common radio frequencies. In the case of New Jersey Transit, acting as a host railroad:

- The channel set for the ASES II system will be used by NJ TRANSIT Trains, Amtrak Trains, and Metro-North Trains

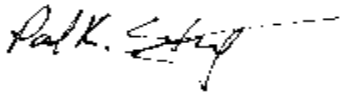
- The I-ETMS channels implemented on NJ TRANSIT lines will be used by NS, Conrail, M&E, and SRNJ trains

In addition, NJ TRANSIT operates as a tenant on a section of rail line where Conrail is the host. This operating arrangement involves a cooperative implementation of PTC and use of frequencies. There is not currently a consolidated radio design for adjacent rail lines. As PTC radios and communications management devices are still being developed and bench-tested, safe geographic separation in order to not interfere with an adjacent line using the same channel has no real-world validation.

Similarly, the channel utilization on a per locomotive basis is under development so that accurate predictions for multi-railroad use of a common site are difficult. This is an area for improvement and would benefit from having the FCC appoint a coordinator to assist in these matters.

NJ TRANSIT appreciates the opportunity to provide its perspective to the FCC on this critical matter affecting all passenger and most freight railroads in the United States in their collective effort to enhance rail safety for the public, passengers and their employees.

Sincerely



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